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SOURCE Sel'khoz mashina, No 12 1950NEW MACHINES FOR SOVIET ANIMAL HUSBANDRY

Engineers A. V. Chumak and A. A. Shvetsov

Since the publication of the Three-Year Plan (1949-51) for the development of the livestock industry, issued by the Council of Ministers USSR and the TsK VKP(b), designers and scientific workers of the SKB (Special Design Bureau) attached to the Gomsel'mash Plant, the VISKhOM (All-Union Institute of Agricultural-Machine Building), and the VIM (All-Union Institute for the Mechanization of Agriculture) have worked out a number of new machines and improved some of the existing models for the livestock industry. These include the following:

SK-1.2 Silage Combine

This machine, which has a single-row attachment to harvest plants with tall stalks, is a product of the joint efforts of the VISKhOM and the Gomsel'mash SKB. It has shown good performance in tests.

The combine mows the plants, cuts them into pieces, gathers them into a hopper and, subsequently, discharges them. It is powered from the take-off shaft of an STZ, VTZ, or KD-35 tractor, and requires two workers to operate it.

The machine consists of a cutting part with a reeling frame and conveyer, a drum-type silage cutter with a worm conveyer, and a hopper. The plants are cut at the root and picked up by the conveyer which leads to the drum. There they are cut into pieces 13-15 millimeters long. The resulting mass passes on to the worm conveyer and then into the hopper. In proportion as the hopper is filled the mass is discharged by a strip conveyer to a truck or directly into the silo.

A special one-row attachment for plants whose stalks are more than 2 meters high, such as maize, sunflower, and other cultures, is mounted on the basic frame in lieu of the cutting parts and conveyers. The attachment consists of a special cutting mechanism with enlarged segmented blades and a chain conveyer with an in-take mechanism.

- 1 -

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Specifications of the silage combine are as follows: span -- 1.2 meters, drum diameter -- 400 millimeters, drum revolutions per minute -- 1,034, hopper volume -- 2.5 cubic meters, optimum production capacity -- 15 tons per hour, normal production capacity -- 6-7 tons per hour, and over-all dimensions 3.8 meters high, 4.2 meters long, and 3.15 meters wide.

PSS-6.0 Straw Cutter

This machine, the productivity of which is 6 tons per hour, cuts green plants, which it conveys to the silo tower. It may also be used to prepare raw fodder that is to be fed immediately to the cattle.

The machine consists of a feed mechanism, cutting device, transfer mechanism, conveyer pipes, and running gear.

The feed mechanism consists of a conveyer and feed roller which compresses the mass and pushes it toward the cutting apparatus. The drum-type cutting device, which is equipped with shovels, cuts up the product and conveys it to the silo tower. The design of the metal frame is based on the assumption that the machine will be stationary or will be moved over very short distances.

The machine requires a power supply of 5.4 kilowatts. It is 2.7 meters high, 1.77 meters long, and 2.0 meters wide. Its total weight is 720 kilograms.

ZKP-1.0 Mobile Fodder-Steamng Aggregate

This machine, which steams potatoes on animal husbandry farms, was worked out by the Gomsel'mash SKB in collaboration with the VISKhom. It consists of a steam boiler, pump, water safety mechanism, three steam vats, and a two-wheel running gear.

The steam boiler, of the vertical type, has a heating surface of 5.6 square meters. It has a water heater in its upper part, which is a closed cylinder with nine smoke-consuming pipes welded into its top and bottom.

The safety mechanism is designed for a maximum pressure of 0.25 atmosphere.

Each of the vats holds 300 kilograms of potatoes, and is equipped with steam-distributing pipes and a grating made of sheet steel.

A crane is mounted on the machine for lifting and moving the boiler

The boiler must be heated 45 minutes to yield a steam pressure of 0.1 atmosphere. The coal consumed is 2.7-3.2 kilograms per centner. The time required to steam a vat of potatoes is 18-23 minutes.

MP-2.5 Root-Vegetable and Tuber Washer

The ZKP-1.0 steaming machine is used in combination with the MP-2.5, which is designed to wash potatoes and root crops before they are stored in silos or fed raw to the animals.

The MP-2.5, a drum-type and continuous-action machine, can be operated by hand or mechanically. It consists of a frame on which are mounted a loading tray, two drums, a trough, an unloading tray, and a drive mechanism. The tray is in the form of an inclined grating with side walls. The drums are 600 millimeters in diameter and have a grated surface of strip steel. Discharging scoops are mounted inside the drums.

- 2 -

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50X1-HUM

The transmission mechanism consists of a pair of conical and a pair of cylindrical gears. At the end of the intermediate shaft, a handle is mounted for hand operation; and at the free end of the drive, there is a pulley which permits the machine to be operated by a motor. The machine can wash 2 tons per hour when hand-operated and 3 tons per hour when operated mechanically. It consumes 0.2 liter of water per kilogram. When motor-driven, it requires a power supply of 0.125 kilowatt.

KM-1.5 Potato Crusher

This machine, which crushes potatoes after they have been steamed was worked out by Gomsel'mash SKB and is already in production. When powered by a 1.5 kilowatt motor, it processes 3.0 tons per hour; it can also be operated by hand.

IK-3 Coarse-Fodder Crusher

This machine is designed to cut up thick-stemmed plants like maize, sorghum, coarse hay, and green plants; to grind up oil cakes, mineral fodder ingredients, and fertilizers; and to husk or grind grain. Powered by a 6-16 kilowatt motor, it crushes fodder for silo storage at the rate of 3.5-4 tons per hour and dry fodder at the rate of 0.7 ton per hour. The drum cutter revolves normally at the rate of 1,000 revolutions per minute.

The IK-3, designed by the Gomsel'mash SKB in collaboration with VIM, has been in production since 1950. It is a general-purpose machine and can replace other machines, such as a silage cutter, oil-cake grinder, root cutter, and crusher.

VE-2.5 Towerless Water-Pumping Station

This machine was designed by the VIM in collaboration with the Gomsel'mash SKB and is scheduled for series production in 1951. It is intended for pumping water from deep wells on animal husbandry farms and yields 10-30 cubic meters in 24 hours.

Its basic units are an air and water tank 0.8 cubic meter in volume, a flanged moisture-proof 1.5-kilowatt motor, a four-chamber pump, a pneumatic pressure regulator, and pipelines.

* * *

VISKhom has designed the following machines for enterprises engaged in breeding animals that are kept on the range:

Well-Digging Machine

It is of utmost importance for the development of range-animal husbandry to dig wells in the desert regions of Kazakhstan, North Caucasus, and other USSR areas, where water may be obtained at comparatively low depths by exploiting soft water-bearing strata. In this case, however, it is necessary to dig square or round shafts having a diameter not less than one meter. It is necessary to penetrate the stratum at least 2 meters to insure a water reserve for 750-1,000 head of cattle during periods when the flow of water is slow. The depth of such a shaft does not as a rule exceed 30 meters. (In Kazakhstan, 95 percent of the wells are 13 meters deep or less.) Digging by hand at a depth exceeding 10 meters is dangerous because of possible cave-ins.

The first model of a machine for the simultaneous digging and bracing of a shaft, known as the KSh-25, was built in 1949. It performs the basic labor-consuming tasks, i.e., digging and bringing the dirt to the surface, and can work

- 3 -

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50X1-HUM

at full capacity in sand or quicksand. It was given a series of tests in March 1950, in the course of which wells were dug in different types of beds 7-29 meters deep. The column of water in the wells reached 5-6 meters. Tests have established an average speed of 1.15 meters per hour for digging shafts.

The entire aggregate consists of a truck trailer, tower, drill with extensor rods, and attachments for lowering the supporting rings into the shaft.

The trailer is equipped with an MK 32-horsepower gasoline engine, a reducer, and a hoisting crane. The free part of the platform serves to carry the drill pipe, attachments, and the tower itself. The driving gear that turns the drilling rods is mounted on the tower; also, mounted is a lead pipe to the end of which is attached a screw for releasing new rods in case of an emergency.

The basic working part of the machine is a cylindrical drill 800 millimeters in diameter with dilators. It serves the double purpose of drilling and acting as a reservoir to collect the dirt after it has been broken up. As the drill revolves, blades located in its tapered bottom break up the dirt, and the dirt is forced inside the drill through the lower vents. At the same time the dilators, located at the drill's upper rim, cut the dirt along the wall's ringed surface (up to 1,200 millimeters) and throw it into the drill. In this manner, the drill is filled with dirt at the top and bottom simultaneously. As a result a cylindrical shaft 1,200 millimeters in diameter is formed, with a cylindrical bottom 800 millimeters in diameter. One work cycle, i.e., lowering the drill and collecting, raising, and unloading the dirt, takes 6-7 minutes.

For transport purposes, the tower is turned around and placed in the trailer. When folded, the aggregate may be transported on a ZIS-150 truck or tractor.

SPT-2.6 Snowplow

This machine is designed to clear the snow from winter grazing lands or to clear a passage over which cattle may be driven to the feeding barn. It consists of moldboards with shares and extension parts, three supporting skis, and two drawbars with an axle. It is suspended from the front part of an STZ-NATI tractor.

The moldboards, concave in form, are welded at the front to a vertical blade which cuts the snow layer in two. The moldboards are placed at an angle of 80 degrees to one another. They are 650 millimeters high in the front part and 900 millimeters in the rear. The shares, which cut the snow into horizontal layers, are fastened to the lower part of the moldboard. When the snow is shallow, extensions may be attached; a wider span and full utilization of tractor's power is thus obtained. As the moldboards move, they displace the snow in its entire thickness on both sides, leaving a clear passage 2.6 meters wide (without extensions) or 3.5 meters (with extensions).

Incubators

Along with the Rekord-39 electric incubators, designed for large poultry farms, with room for 39,000 eggs, there is also a need for sectional incubators for smaller poultry enterprises, which may be heated by kerosene or coal. Two variants of such a machine have been designed by the VISKhom in accordance with plans by Engineer B. K. Goretskiy. The ISK-2.4, which has a capacity of 2,400 eggs, is heated by kerosene; the ISU-24 holds 24,000 eggs and is heated by coal. The incubators are similar in construction but differ in the design of the heating systems and boilers.

- 4 -

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Each incubator consists of a thermostatic box into which the eggs are placed a water-pipe system, boiler, turning mechanism, gauges for regulating the air and water temperatures, and thermometers and psychrometers for measuring the temperature and moisture in the chamber of the incubator.

The thermostatic box of the ISK-2.4 is made of wood and has ten sections into which the trays with eggs are placed. The sections have ventilating shutters which open and close automatically. The turning mechanism, located on the rear wall of the incubator, turns the eggs in all the trays simultaneously, 45 degrees to one side or the other. The air in the chamber is warmed by flat pipes placed over the trays.

The temperature in the water pipes is maintained at 45-65 degrees by a thermoregulator. The water is warmed by two kerosene gas heaters under the boiler. Thirty tubes placed vertically in the boiler bring up the hot gases from the heater. When the damper is the smoke chimney is open, the gases pass through the 12 middle tubes; when it is closed, the gases pass through all the tubes. The damper is automatically controlled by the thermoregulator.

In addition to the machines described above, other new machines are currently undergoing tests. These include a tractor-drawn manure loader and manure spreader, overhead and ground conveyers, and others. Additional machines will be designed in 1951 for the mechanization of labor-consuming tasks on farms.

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- 5 -

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